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National Defense Industrial Association
3rd Annual Missiles and Rockets Conference

Panama City, Florida

Future Technologies For Rockets And Missiles

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U.S. Army Space And Missile Defense Technical Center

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Topics

- SMDC Missions
- Technical Center Core Functions
- Missile Defense Technology
- Directed Energy Technology
- Space Technology
- Summary

SMDC Missions

Army Proponent for Space and Ground Based Missile Defense

Command and Control Army Space Forces

Develop Technology, Experiment, Test, and Field Systems

Theater Missile Defense Operational Integrator for the Army

Commander Army Forces Computer Network Attack/Defense

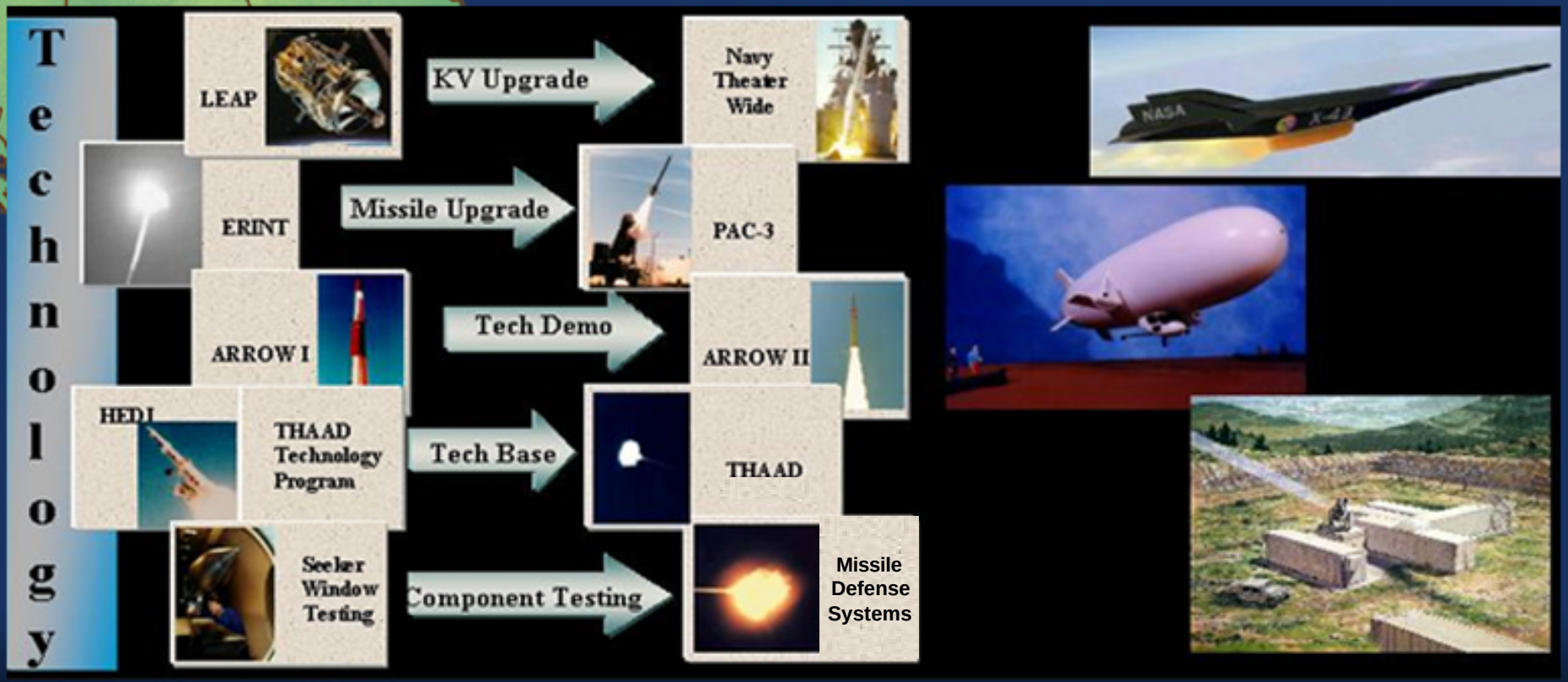
Operate National Range and Test Facilities (USAKA, HELSTF)

Focused on the Future

Space and Missile Defense Technical Center

Mission

The Technical Center executes space and missile defense technology research, development, test, and evaluation.



Technical Center Core Functions

- Advanced Research . . . Small Business Innovative Research, University Collaboration, and DARPA Programs
- Technology Development . . . basic research, instrumentation, and space technology
- Directed Energy . . . solid state, high energy, and tactical lasers
- Kinetic Energy . . . atmospheric, high-endo, exo-, discriminating, and Ground-Based Midcourse Defense lethality
- Sensor Technology . . . active and passive sensors
- Experiments . . . critical measurements programs and technology demonstrations
- Test Platforms . . . airborne test measurements platforms
- Information Superiority . . . wide band infrastructure, Missile Defense Analysis Capability
- Systems Engineering . . . Joint missile defense concepts analysis & review
- Data Analysis Exploitation . . . weapon algorithms, kill assessment, & realtime discrimination

Innovative Technology Development

INTERCEPTOR

One Color Seeker

Two Color Seeker

Two Color Seeker Plus LADAR

Energetic Warheads

Miniature Kill Vehicles

Lasers

Chemical

Solid State

Single Re-entry Vehicles

Multiple Re-entry Vehicles Decoys

Multiple Re-entry Vehicles PENAIDS

Electronic Countermeasures

THREAT

RADAR

Increased Range

Counter Electronic Countermeasures

Resolve Multiple Targets

Improved Discrimination

Innovative Technology Required to Defeat Future Threats

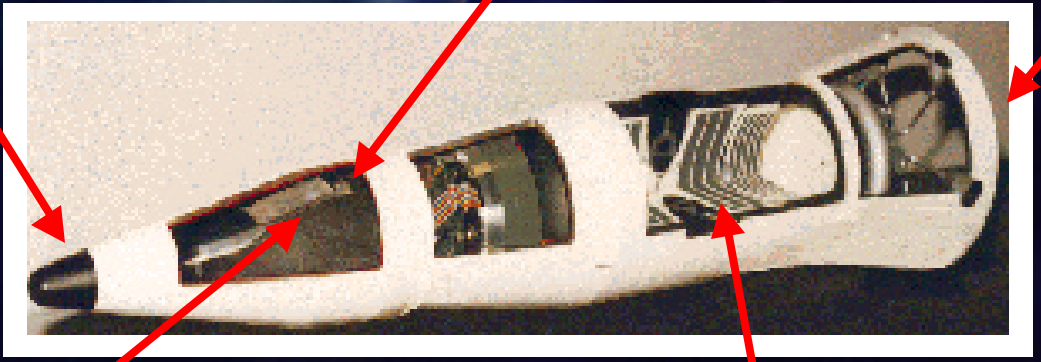
High Endo Interceptor Technologies and Programs

Atmospheric Interceptor Technology (AIT)

Advanced Thermal/ Nosetip Protection
- Lower Altitude Operation
- Higher Interceptor Velocities

Strapdown Seeker
- Hit-to-Kill with Aimpoint Selection
- Active Mirror Stabilization

Integrated Lightweight Vehicle
- Rapid Response for Hit-to-Kill



Cooled Infrared (IR) Windows
- Lower Altitude Operation
- Higher Interceptor Velocities

Lightweight Solid Divert & Attitude Control System (DACS)
- Fast Response for Hit-to-Kill
- Bi-Level Attitude Control System for Aimpoint Insensitive Munitions

AIT'S Technology Base is Applicable to All Missile Defense Interceptors

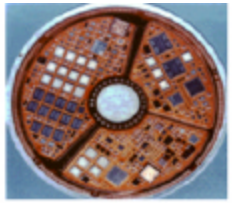
Exo-Interceptor Technologies and Programs

Technology Objectives

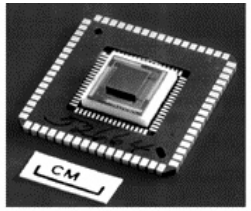
- Proof-of-principle, Fire-and-forget, Smart Interceptor for Exo-atmospheric Missions

Programs

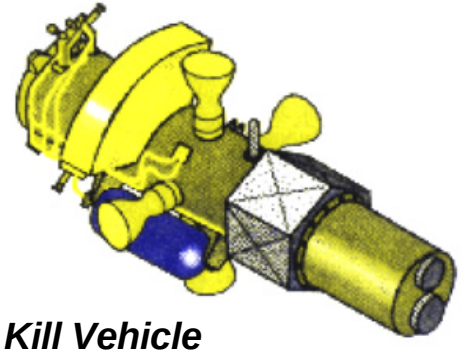
- Develop and Integrate Technologies into a Demonstration Program for Next Generation Interceptor
  - * *Multi-Function Sensor Modules*
  - * *Rad-Hardened Advanced Electronics*
  - * *High Performance Boosters*
  - * *Cooled Optics for Long-Range Seekers*
  - * *Advanced Data Fusion Algorithms*
  - * *High-G Solid Divert Propulsion*
  - * *Next Generation Beyond GMD (GBI)*



Advanced Electronics

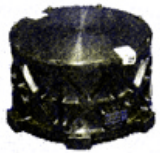


Two Color FPA

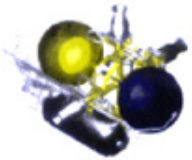


Kill Vehicle

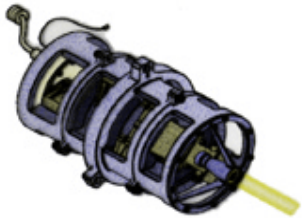
Lightweight Optics



IMU

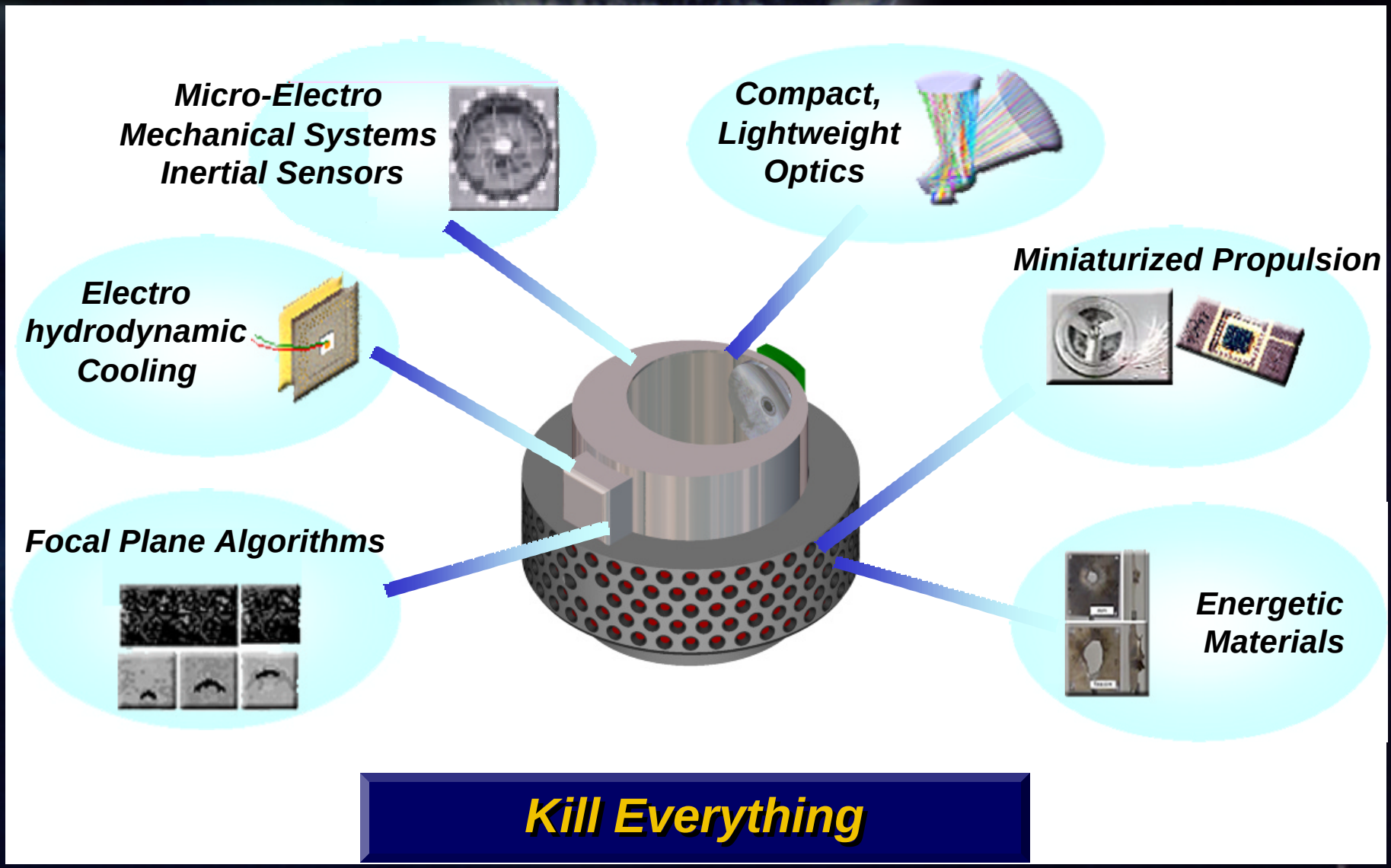


Propulsion



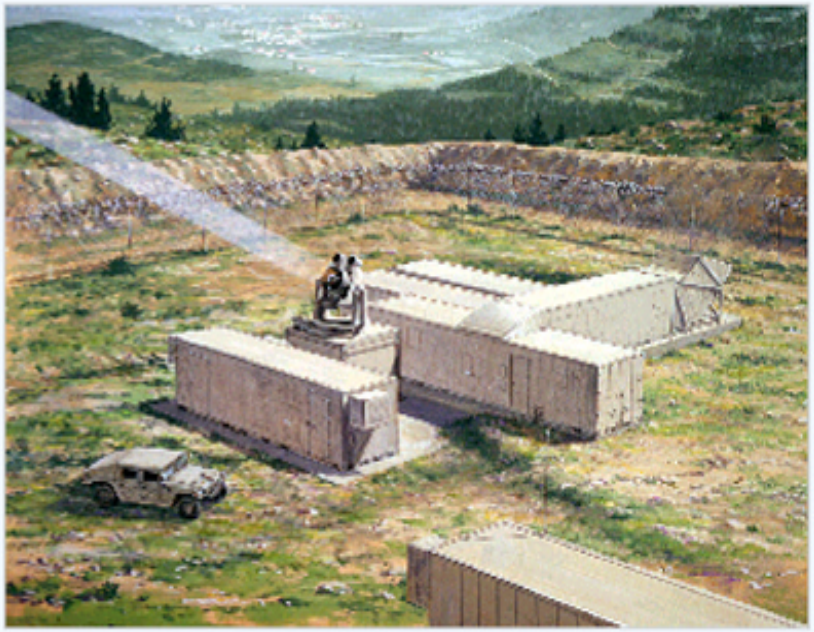
LADAR

Miniature Kill Vehicles Enabling Technologies



Directed Energy Technology

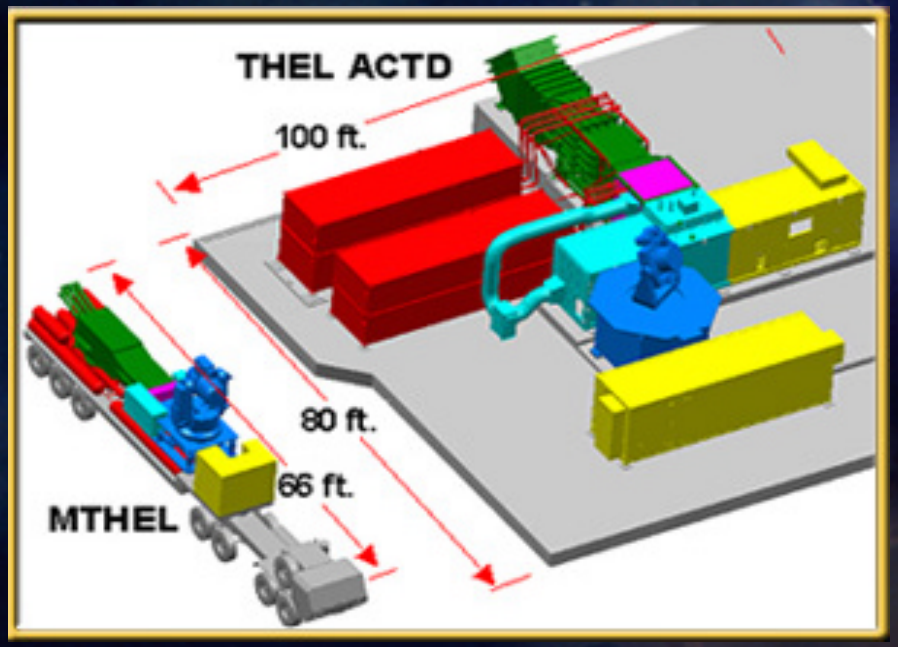
- Directed Energy Weapon Systems
- Solid State Laser
- Tactical High Energy Laser (THEL)
- Directed Energy Master Plan
- High Energy Laser System Test Facility (HELSTF)
- Advanced Technologies



Mobile Tactical High Energy Laser

MTHEL Goals

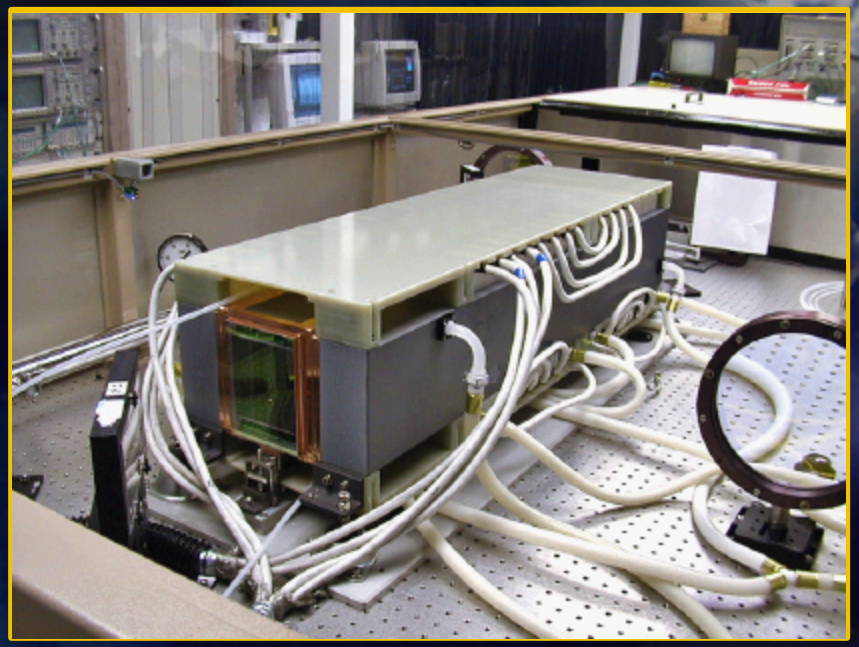
- Package a high energy deuterium fluoride chemical laser on a mobile platform to meet US Army and Israeli air and missile defense needs
- Incorporate reliability, maintainability, and performance flexibility into the design



First TRW MTHEL Concept Design

Objective Concept

Solid State Laser Technology

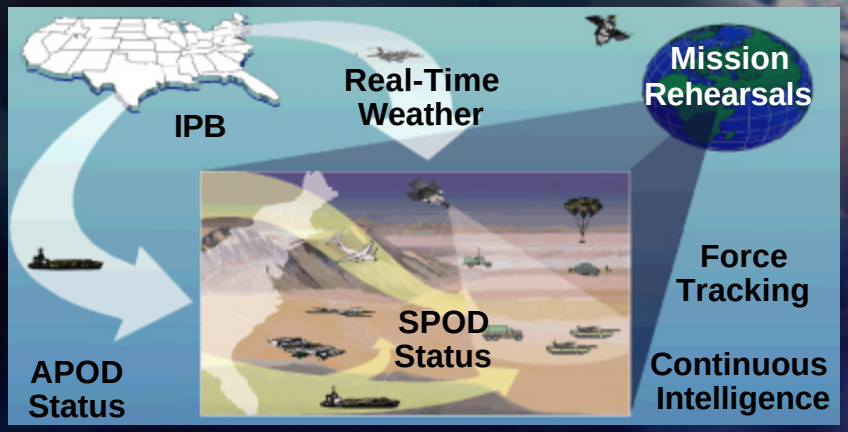


- Leverages cooperative development with DoD/DoE Labs and Industry
- Potential to be the first HEL technology compact enough to fit within FCS size and weight constraints

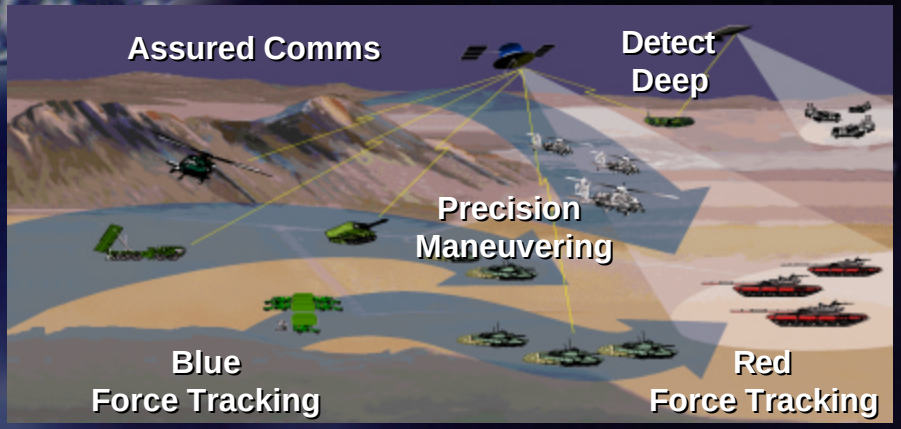
10 k W Breadboard (3 Modules)
- Pulse Repetition Frequency = 20Hz
- Beam Quality = 3 x Diffraction Limited
- Energy = 500 J/pulse

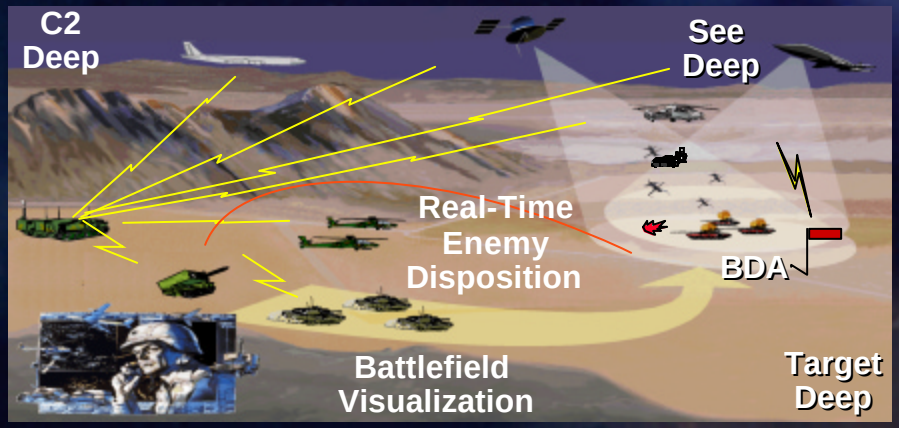
Space: Critical to Meet Challenges & Protect Assets/Forces

Force Projection

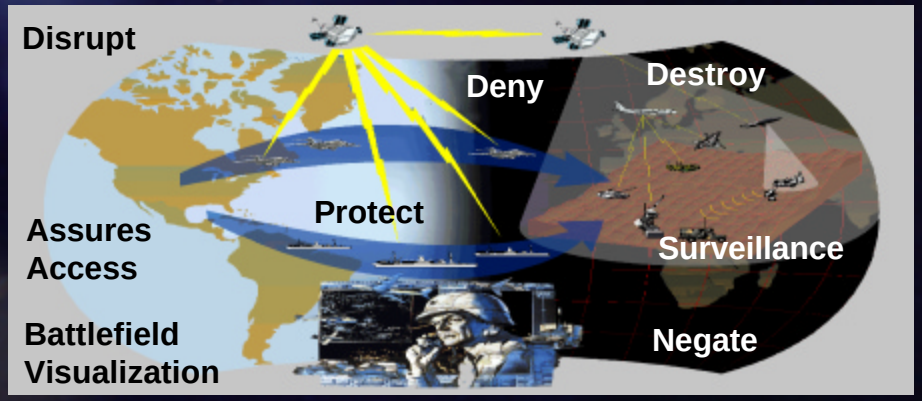


Force Application





Force Enhancement

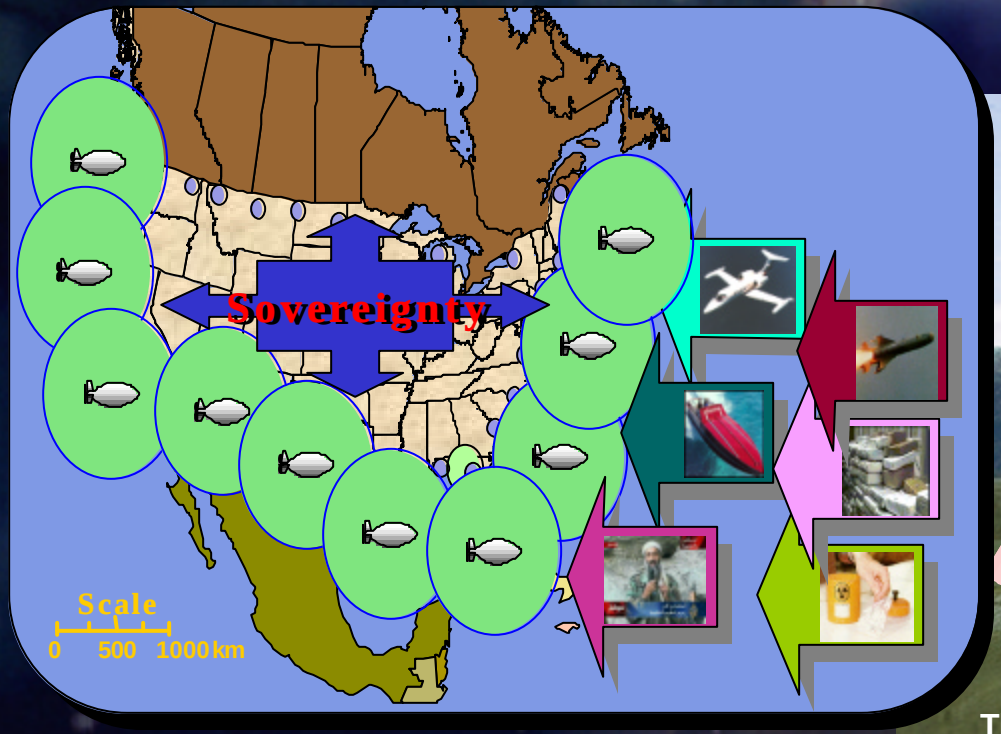


Space Control

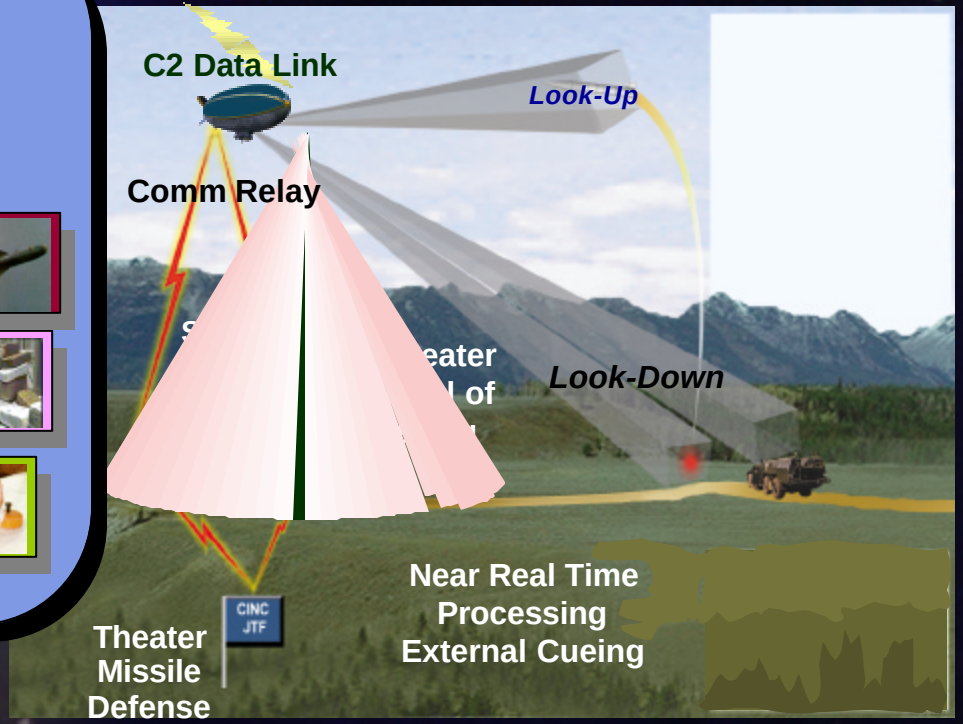
Space Control Protects and Enhances Survivability and Preserves our Fire Support

Objective High Altitude Airship Mission

Homeland Defense

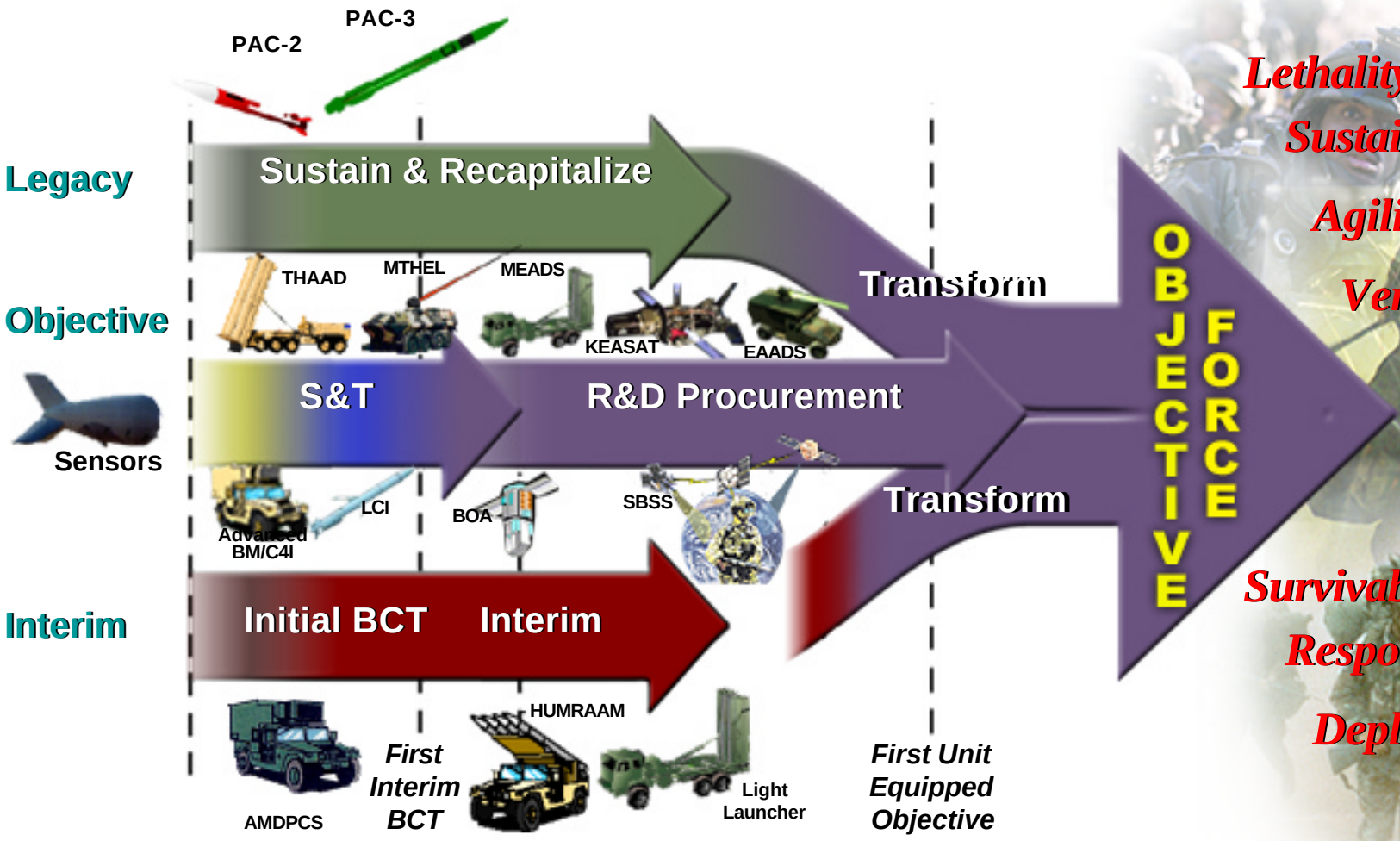


Theater Operations



"A Multi-Purpose Platform for the Transformation Force"

Objective Force



Summary

- *Successful Legacy* in Support of Missile Defense
- Provide *Leading Edge Technology* to Meet National and Warfighter Space and Missile Defense Requirements
- Provide Leap Ahead Technology to *Support Army Space Missions*
- Provide Technology to *Support the Army Transformation to* the Objective Force

SMDC is Developing Enabling Technologies for the Future Warfighter!

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Panel Discussion

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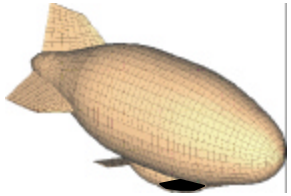
What we do for the Army . . .

Directed Energy



Advanced Concept Technical Demos

Space Control

Basic Science and Technology Research

Science Technical Objectives

Transitioning Enabling Technology to the Objective Force

Future Warfighter

Research Processes and Mission Areas

What we do for the Missile Defense Agency . . .